# AVIATION

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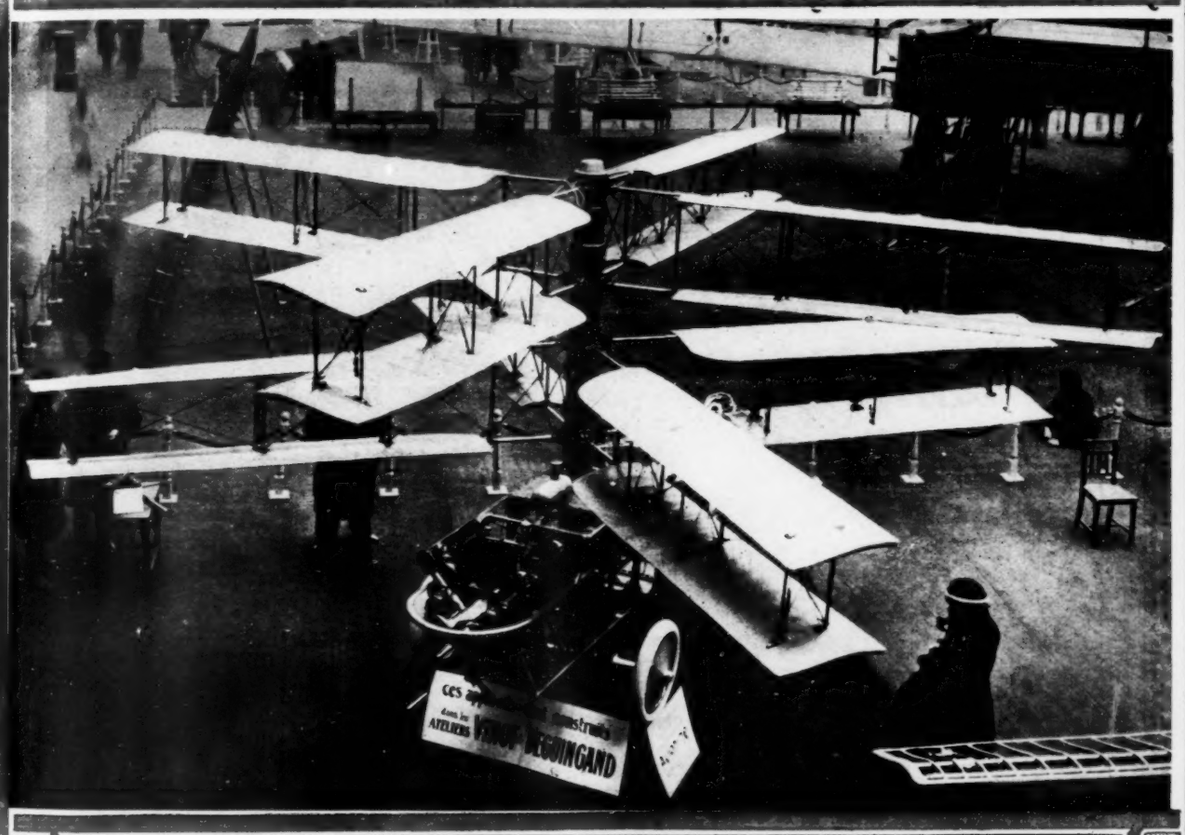

The latest Pateras-Pescara helicopter, shown at the Paris Salon

VOLUME XIV

Number 7

## SPECIAL FEATURES

OFFICIAL WORLD'S RECORDS FOR 1922

FRENCH PILOTS MAKE 8 HR. GLIDING RECORDS

ECONOMIC AND CONSTRUCTIONAL LIMITS OF AIRSHIPS

AIR STATIONS PLANNED FOR NAVAL SHORE ESTABLISHMENTS

THE GARDNER, MOFFAT CO., INC.

HIGHLAND, N. Y.

225 FOURTH AVENUE, NEW YORK

Entered as Second-Class Matter, Nov. 22, 1920, at the Post Office at Highland, N. Y. under Act of March 3, 1879.

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FEBRUARY 12, 1923

# AVIATION

VOL. XIV. NO. 7

*Member of the Audit Bureau of Circulations*

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# AVIATION

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Vol. XIV FEBRUARY 12, 1923 No. 7

## Sound Opinion

IN a recent statement, John J. Roscob, of the General Motors Corporation, put into a few words the crucial difficulty in which the aeronautical industry finds itself. His words should be taken to represent the present attitude of "big business" toward aircraft industrial expansion.

"It is," says Mr. Roscob, "a matter of great moment to the aircraft industry whether or not a nation-wide commercial use of aircraft is brought into being. In a word, the aircraft industry can no longer live on Governmental orders, it must be sustained by a general use of aircraft in the progressive business circles of our country. Nor can the aircraft industry continue to serve the Army and Navy on a competitive basis, because competitive building of airplanes and motors results in a net loss to those concerns which are called upon by the Government to build the few experimental and training planes necessary to keep up peace-time establishment; while in the case of the Air Mail there is a limit, by Congressional action, on the number of planes which may be bought in a given year, and that number is too small to return any profits to the manufacturers."

Such an opinion, coming as it does from a man whose financial broadmindedness is known throughout the country, should be given the most serious thought. While this condition has been common knowledge within the aircraft industry for a long time, it became particularly apparent during 1922 when practically all constructors of aeronautic material faced the perils of a single outlet for their product.

The way out of the predicament is easy to find, although it is surrounded by many barriers that will have to be removed before the era of aircraft can arrive. The government, as has been repeatedly pointed out, should have a new method of contracting for its aircraft equipment. Even the contracting officials desire a modification of the existing laws, under which they operate, but this must come from new legislation, which is difficult to secure, and requires time to originate. Until then aviation must suffer from a vicious competitive system which fails to give a fair basis for comparison of estimates. One company may be in a sound financial condition, with a competent staff and a well equipped factory, and make a bid which will bring it profit. Against this bid may be placed an estimate from a company inadequately financed and with very scant overhead, which, as is often the case, will bid at a price precluding any profit. Such a situation can only result in disastrous competition.

The other requirement of the aircraft industry is the development of such fields of action as will attract capital to aircraft enterprises. Every thoughtful businessman knows that each successive improvement in transportation has led to a progressively large expansion of commerce. That aircraft will take an important share in the fields of commerce is granted.

Sir William Brancker, Director of Civil Aviation for Great Britain, is so confident of the future of air transport that he made the following statement at the third British Air Conference, held in London this month:

"I contend that the air is the most comfortable means of transport today for those who like it. In five years' time, I think, no one will be able to deny its superiority.

"Navigation through any cloud or storm will be as easy to the aircraft of the future as the navigation of the sea is to a big ship of today; and to the skeptical I only say: Compare the latest commercial air liner of today with the 50 hp. 'box-kite' of 1912."

---

## Auxiliary Sailplanes

PERHAPS it is somewhat premature to speak of the "advent of the auxiliary sailplane" in connection with the first Budig glider which is illustrated in this issue. Yet, it is but a year or so that the "practical value" of the gliding experiments which the Germans initiated in the Rhoen hills was almost universally questioned. It was admitted that the experiments afforded a new and inexpensive means for testing new aerofoils and various aerodynamic combinations, and that they offered exhilirating sport, but that was about all.

Nevertheless, the German experimenters maintained from the first that the wind propelled sailplanes would eventually develop into low powered airplanes which could fly with engine power and also take advantage of atmospheric conditions favorable for soaring. The Budig sailplane marks the first step toward this development, and deserves as such particular attention.

The new French gliding records of seven and eight hours afford, on the other hand, a striking illustration of how not only gliders but even lightly loaded airplanes can remain aloft for almost indefinite periods, provided wind conditions are suitable. It is evident then that the question of economic flight is making considerable headway in the right direction. The relative experiments demand so little initial outlay, and the results may be so full of promising possibilities that we should like to see Americans engage in this work.

In this connection attention is called to the survey of gliding and soaring terrains which the National Aeronautic Association has initiated, and which, we hope, will receive the full support of all those interested in aeronautic development. Before any experiments can take place in this country that will advance the art of motorless flight and low powered flight, we must know the terrain where such trials can take place under the most favorable conditions. The sooner this is determined, the quicker will American experimenters be able to put their ingenuity at the service of sailplaning.

# Determining Economical and Constructional Limits of Airships

*By Col. G. Arturo Crocco*

**Royal Italian Army Air Service**

In air navigation effected by lighter-than-air craft, as also in the case of sea navigation, an increase in dimensions is always an advantage because the power necessary for obtaining a certain velocity increases in a minor degree than does the available total buoyant force. In the case of ships and airships of similar shape, the power varies more or less in proportion to the square of the dimensions, while the total buoyant force increases in proportion to the cube. Consequently the unit power, that is, the ratio between the total

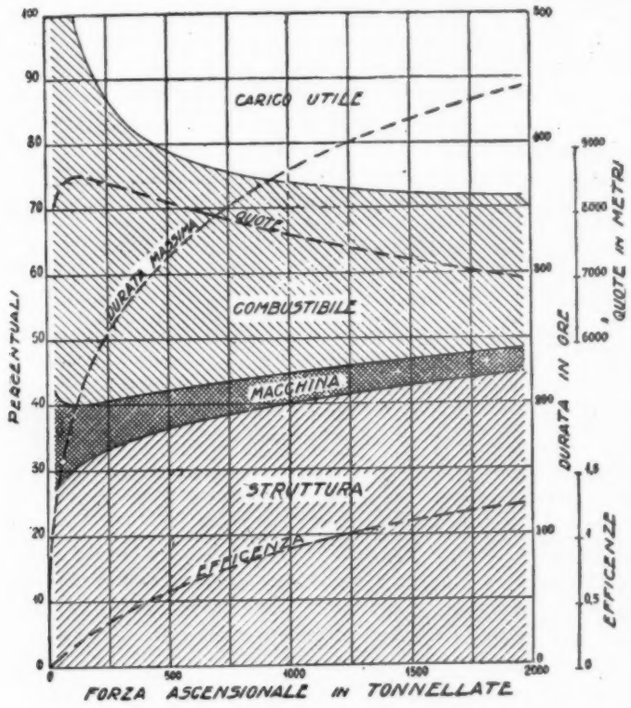



*Diagram showing economical and constructional limits of airships*

power and the buoyant force varies *in inverse proportion to the dimensions.*

The result is that the weight of the machinery, referred to the total buoyant force, also varies according to the same law.

However, there is one drawback to the advantage of increased dimensions; that is, that the weight of the structure increases in greater measure than the buoyant force does. It is not possible to determine this by a general formula. In order to establish a formula which has the advantage of simplicity, we shall consider the structure as being divided into two parts; one part subject to tension and compression stresses, varying directly with the lifting forces; the other part subject to stresses varying in proportion to the surfaces, or subject to stresses which are not strictly definable.

The weight of the first part of the structure will vary as the product of the volume multiplied by the length; that is according to the fourth power of the dimensions. The weight of the second part of the structure will vary as the product of the surface multiplied by the distance, that is according to the cube of the dimensions. For considerations of safety we will assume the variation of the weight in those organs where the stresses are not strictly definable, to be also of the same order of magnitude, that is, proportional to the cube of the dimensions.

Consequently, by calculating the ratio between these weights and the total lifting force, we get a value increasing in direct proportion to the dimensions. This is therefore a constant.

Consequently, the percentage of the buoyant force absorbed by the dead weight of the airship may be set down in the following formula in which the diameter $D$ of the main section has been given prominence:

$$\text{Percentage dead weight} = k + \frac{D}{s} + \frac{m}{D}$$

The first two terms relate to what we have defined in one word: *structure.* The third term relates to what we have defined: *machinery.*

The above considerations reveal the existence of minimums which we shall now examine. Primarily, we find a minimum of dead weight in the case of dimensions for which is reached the relation:

$$D_1 = \sqrt{s \cdot m}.$$

To this minimum corresponds the lightest-per-unit airship, that is, the airship which is able to lift the maximum free load, and consequently climb to the maximum altitude. This type of airship is also the most economical if it is employed for short flights, in which case the weight of the fuel is a negligible fraction compared to the free load.

On the other hand, if the airship is used for long flights, the weight of the fuel consequently increasing to very great extent, then the existence of a second minimum is revealed by considering also the weight of the fuel necessary for a given range. This weight being proportional to the power of the machinery and to the endurance $T$ will assume the form $\frac{cT}{D}$; consequently, the residual useful load will be expressed:

$$\text{Useful load} = 1 - k - \frac{D}{s} - \frac{m + cT}{D}$$

the maximum value will be obtained, in the case of the diameter,

$$D_2 = \sqrt{s\,(m + cT)}.$$

By making the useful load zero in the preceding expression, we obtain the maximum endurance:

$$T = \frac{1}{c}\left( (1 - k)\, D - \frac{D^2}{s} - m \right)$$

which becomes optimum in the case of

$$D_3 = \frac{1}{2}(1 - k)\, s;$$

extreme diameter corresponding to the maximum attainable endurance.

This extreme limit coincides with the limit of the highest economical efficiency, that is, it coincides with the limit which is obtained by ascertaining the maximum value of the ratio between the useful load and fuel.

This ratio is expressed by the formula

$$\text{Efficiency} = \frac{(1-k)\,D - \frac{D^3}{S} - m - cT}{cT}$$

and the maximum is obtained in the case of:

$$D_1 = D_3 = \tfrac{1}{2}\,(1-k)\,s$$

An example of the preceding relations will be given on the basis of the numerical values of one of the most recent projects of a semi-rigid type of airship. However, as these values have not yet been actually proved, we mention them merely as an example of the probable values which may be attained by improved construction.

By considering the diameter $D$ in meters and assuming a cruising velocity of 100 kilometers per hour, we have deduced:

$k = 0.215$ ; $m = 2.77$ ;
$s = 325$ ; $c = 0.0861$;

from which we obtain the following limits in round figures:

| | | | |
|---|---|---|---|
| Dead weight ..... | $D_1 =$ | 30 | |
| Useful load ..... | $D_2 =$ | 48 per T = | 30 hr. |
| | $D_2 =$ | 61 " " = | 100 " |
| | $D_2 =$ | 71 " " = | 150 " |
| | $D_2 =$ | 86 " " = | 200 " |
| Endurance..... | $D_3 =$ | 128 | |
| Efficiency..... | $D_4 =$ | 128 | |

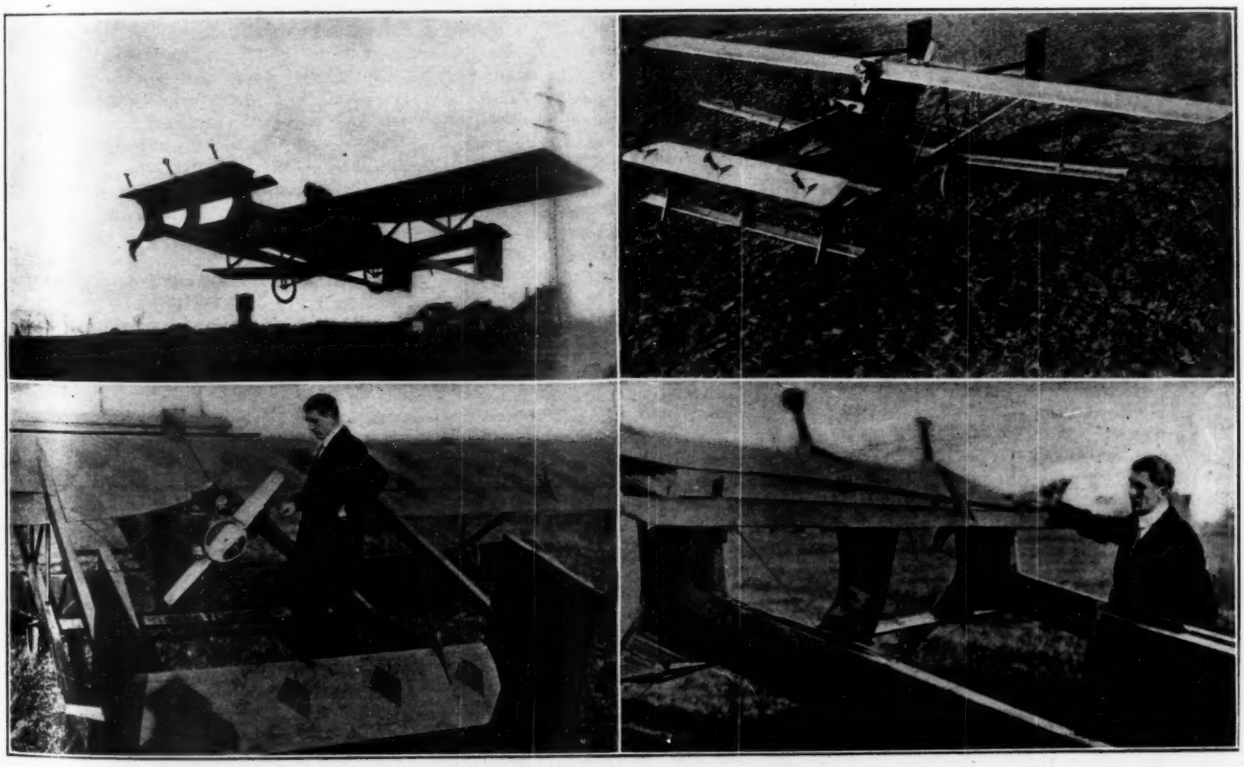
As these limits correspond to considerable volumes, there remains a sufficient margin for introducing improvements in the technique of airship construction. It is to be noted, however, that the *gain* in useful load, in endurance, and in efficiency decreases as the dimensions increase, so that from a practical standpoint it is not expedient to exceed certain limits. Therefore, we have thought fit to include a diagram of the dead weights, useful loads, and efficiencies. The diagram is plotted for an endurance of 200 hr., referring it to the total floating forces expressed in tons. The diagram clearly shows that it is expedient to increase the dimensions up to a limit of about 1000 tons, corresponding to a diameter of 60 meters.

The following key explains the Italian notations of the diagram: *Carico utile,* useful load; *quote,* ceiling; *durata massima,* maximum endurance; *combustibile,* fuel load; *macchina,* power plant; *struttura,* structural weight; *efficienza,* efficiency; *forza ascensionale in tonnellate,* lifting force in tons; *durate in ore,* endurance in hours.

## An Auxiliary Sailplane has Flown

The prediction made in Germany that the gliding experiments of the Rhön hills would lead to the construction of "auxiliary sailplanes," that is gliders equipped with a small engine that would take off and maintain the machine in flight in the absence of ascending currents, has been borne out by subsequent events. The Budig auxiliary sailplane, as may be seen from an accompanying illustration below, has actually flown with its small 4 hp. B.M.W. engine.

Little information is on hand regarding this machine, which is said to be automatically stable. It appears that the front stabilizer incorporates a bellow arrangement which is inflated by the relative air stream in proportion to its speed. The air is led into the bellows through three horn like exrescences. At normal flying speed the bellows are probably flat, but when the speed of the wind suddenly increases, as in a horizontal gust, the bellows open up and so change the angle of incidence of the stabilizer. German gliding experimenters consider such a "wind feeler" as being absolutely necessary for dynamic soaring, that is soaring in horizontal gusts of varying intensity and direction.



*The Budig auxiliary sailplane: The upper pictures show the machine in flight and on the ground; the lower left hand picture, the 4 hp. B.M.W. auxiliary engine with its peculiar propeller; the lower right hand picture, the front stabilizer with its bellow arrangement, the inventor depressing one side of it*

# Naval Shore Establishments Need Air Stations

## Special Board on Naval Shore Establishments Makes Recommendations for Extensive Aviation Facilities

*By Carl H. Butman*

The importance of naval aviation and the necessity of air stations at all the principal naval bases is evidenced in the report of the Special Naval Board on Shore Establishments appointed by Secretary Denby to make a detailed report as to a definite policy on shore stations.

In the report of the Board, headed by Rear Admiral Hugh Rodman, the necessity of aviation facilities at each of twelve important naval bases is stressed. Two fleet bases on the Pacific Coast, located at San Francisco Bay and Puget Sound, and two similar bases on the Atlantic Coast at New York-Narragansett Bay and the Chesapeake Bay regions are recommended as essential and are to include means for the assembly and repair of aircraft, training units, and for the operation of aircraft on coast defense duty.

The other bases where Naval Air Stations are required are two advanced bases at the Canal Zone and in the Hawaiian Islands, and at six secondary naval bases at San Diego, Alaska, Eastern West Indies, the Boston-Portsmouth region, the Key West region and Charleston, S. C.

The report of the Board, with Secretary Denby's approval, was forwarded to Congress on Jan. 15 for consideration by the Naval Affairs Committees of the Senate and House.

Under "Naval Air Stations," the report reads as follows:

### *Naval Air Stations*

"The mission of naval aircraft is as follows: Operations from mobile floating bases or from naval air stations on shore—

(a) As an arm of the Fleet;
(b) For overseas scouting:
(c) Against enemy establishments on shore when such operations are conducted in cooperation with other types of naval forces, or alone when their mission is primarily naval;
(d) To protect coastal sea communications by—
(I) Reconnaissance and patrol of coastal sea areas;
(II) Convoy operations;
(III) Attacks on enemy submarines, aircraft, or surface war vessels.
(e) Alone or in cooperation with other arms of the Navy, or with the Army, against enemy vessels engaged in attacks on the coast.

"Rapid advances are being made in aviation as a naval offensive and defensive arm, and such advances may be expected to continue. The experiences of the recent war indicate that in the event of hostilities there will be great expansion of the naval air forces, including the naval air stations.

"The studies of the Board indicate the necessity for aviation facilities at each of the twelve bases named above, these facilities to include means for the assembly and repair of aircraft; for the holding of trained units ready for transfer to the Fleet; and for the operation of aircraft on naval coast defense duty. Facilities to this extent constitute a "Naval Air Station." The Board believes that in time of hostilities it will be necessary to expand one of these air stations on each coast to include the equipment, organization and training of complete units such as scouting squadrons, patrol squadrons, etc.—this in addition to employing the existing training station for aviators at Pensacola. The Board notes that the present air stations at Hampton Roads and San Diego are now best suited to such expansion.

"The establishment of an air station at each of the twelve naval bases, supplemented by the training facilities now at Pensacola, will provide, as far as can be foreseen, all the shore stations needed for the operations of aircraft with the Fleet. During the recent war it was found necessary to establish minor naval air stations at intervals along the Atlantic coast for duties in connection with naval coast defense as outlined above. Their creation again, on either coast where the enemy may threaten, will doubtless be necessary in the event of hostilities.

"The above statements are limited to the requirements for heavier-than-air craft. The possibilities of lighter-than-air craft when used with helium are now under investigation, and this investigation may show the necessity of further provision in the shore stations for the operation of lighter-than-air craft with the Fleet and in the naval coast defense.

"For the present the Board recommends the continued development of the Helium Plant, Fort Worth, Tex. The continued experimental construction and operation of lighter-than-air craft will necessitate retention of the Air Stations at Lakehurst and Cape May.

### *Aviation Facilities Recommended*

"Aviation facilities at the recommended main, advanced and secondary fleet bases with recommendations as to development, are as follows:

*San Francisco Bay.* None at present. An air station should be provided at Alameda.

*Puget Sound.* None at present. An air station should be provided at Sand Point, Washington.

*New York--Narragansett Bay Region.* An air station of a temporary character, on land owned by the city of New York exists at Rockaway Beach, Long Island. The city authorities have requested that the property be vacated. This is the most advantageous site in the New York vicinity for naval coast defense functions. If Rockaway Beach is abandoned, another air station for this Fleet base should be acquired and developed.

*Chesapeake Bay.* The present Naval Air Station, Hampton Roads should be very completely developed as an air station.

*Hawaiian Islands.* The Naval Air Station, Pearl Harbor, should be very completely developed as an air station.

*San Diego, Calif.* The Naval Air Station, San Diego, Calif., should be very completely developed as an air station.

*Canal Zone.* The Naval Air Station, Canal Zone, should be fully developed as an air station.

*Alaska Region.* Aviation development should be limited to selection and acquisition of a site for an air station at this base. (Site to be selected from Public Lands.)

*Eastern West Indies Region.* Aviation development should be limited to selection and acquisition of a site for an air station at this base.

*Boston-Portsmouth Region.* The Naval Air Station, Chatham, now inoperative, should be retained on an inoperative status.

*Key West Region.* Plans should be made for the establishment of an air station at Key West. No actual development for the present.

*Charleston, S. C., Region.* Plans should be made for the establishment of an air station at Parris Island. No actual development for the present.

Other aviation facilities exist as follows:

*Naval Air Station, Anacostia.* A special test and development station for aircraft accessories including radio. Should be retained.

*Naval Air Station, Pensacola, Fla.* This is the training school for naval aviators and naval aviation pilots and observers. Should be retained.

*Naval Aircraft Factory, Philadelphia Navy Yard.* This is highly necessary for the development and manufacture of experimental aircraft and accessories, and for a limited amount of aircraft production work. It should be retained.

"The following is the order in which all existing Naval Air

Stations should be reduced in activity or made inoperative, shou'd conditions of economy require such action with regard to any such station. This list is based upon conditions as they exist today.

Naval Air Station, Chatham, Mass.
Naval Air Station, Cape May, N. J.
Naval Air Station, Rockaway, L. I.
Naval Air Station, Anacostia, D. C.
Naval Air Station, Pensacola, Fla.
Naval Air Station, Hampton Roads, Va.
Naval Air Station, San Diego, Calif.
Naval Air Station, Lakehurst, N. J.
Naval Air Station, Pearl Harbor, T. H.
Naval Air Station, Coco Solo, C. Z.

***Marine Barracks and Activities***

On Marine Corps activities the Board states:

"Marine Barracks are generally a component part of a large command, and their operative status varies with the latter. The Marine Barracks at Quantico, Va., Parris Island, S. C., and The Headquarters Barracks at Washington, D. C, are exceptions. They should be retained. The land occupied by the Marine Flying Field at Quantico should be purchased. A small triangular strip of land necessary to round out the Marine Corps Base at San Diego should be purchased. The Marine Corps Depot of Supplies at Philadelphia should be retained. A Marine storehouse in San Francisco should be acquired."

"The development of the New York-Narragansett Bay base, * * will also necessitate the acquisition * * * of a site for an air station if Rockaway Beach can not be retained," the report states, adding:

"In the case of the Puget Sound Base it will be necessary to acquire a site for a Naval Air Station for which purpose the Board recommends the site at Sand Point on Lake Washington."

"In the case of the advanced base at the Canal Zone, a site on the Pacific side is required for berthing facilities for the Fleet, and for operating facilities for submarines and aircraft. This site has already been requested from the War Department.

"The Board notes that the titles to the sites of the Naval Air Stations at Chatham and Lakehurst and the Marine Flying Field at Quantico have not yet been acquired by the Navy Department. The Board recommends that same be acquired." * * *

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## General Mitchell on Aeronautical Progress

Brig. Gen. William Mitchell, Assistant Chief of the Air Service, speaking before the National Geographic Society on Jan. 19, said, in part:

"Aeronautics is progressing more rapidly at this time both from a scientific standpoint—as far as the development of flying machines of all kinds is concerned—and also in the art of actually handling and flying them. No longer is a speed of two hundred miles an hour impossible. It has been accomplished. No longer is it impossible to rise vertically from the ground. This also is an accomplished fact. We are able to fly at night, through the storms, and through the fog.

"Radio telegraphy makes it possible for us to talk from plane to plane, from the ground to the plane, and from the plane to the ground. Radio is also able to guide us to our landing fields or to any place that we desire to go. In fact, airplanes can be sent on long journeys with no living pilots in them, but controlled by gyroscopic instruments. These automatically controlled airplanes rise from the ground and fly at whatever altitude is set. In addition to this, by the aid of radio impulses, their courses may be changed or, if blown off the course by the wind, they may be brought back to it. Airplanes may be controlled by radio from the air as well as from the ground, so that it is entirely within the realm of possibility that an airplane with its crew may start out and control a number of others flying near and around it.

"Aircraft are the only things in existence that are able to deliver their cargoes at a station in the air. Nothing can compete with them in this respect, so that, from a military standpoint, when it is desired to deliver a bomb, gun, or observe wherever they will have the most effect on an enemy, aircraft have no equals. They are so effective, both against craft on the sea and against organizations on the land, that even in the European War, where they were first used to any extent, they really had a decisive influence. Had either side been deprived of its air force in 1918 the one not having the air force would have been at a hopeless disadvantage and would have been defeated in a short time.

"Each first class nation now relies on its air force as its first line of defense. Each day sees an increase in the radius of action of the airplane. In our own Air Service the airplane has remained aloft for thirty-five hours and during that time has covered some three thousand miles. The distance from Ireland to Newfoundland is only seventeen hundred miles. One of the great Zeppelin airships turned out by the Germans could carry sufficient fuel to go around the world at the latitude of New York. Every airplane, every pilot, and every mechanic used in commercial aviation is a military asset to the Nation. All the foreign nations recognize this fact and heavily subsidize commercial aviation. Gradually the operating cost is being reduced, so that aerial means of transportation are becoming more and more able to compete with transportation on land and water.

"During this year our own Post Office Department will establish a night air mail service between New York and San Francisco and will make the trip in twenty-seven hours, total elapsed time.

"The public, in general, has a misconception of the dangers incident to aviation. Military aviation will always be dangerous, because the aircraft employed must have the greatest speed, the greatest gun power, and the greatest lifting capacity. These things are strained to the limit so as to be able to compete with possible enemies, also, in order to be able to support each other, military airplanes have to fly in close formations, through all kinds of weather and under all conditions.

"On the other hand, commerical aircraft may be constructed with slow landing speeds, large factors of safety, and with reliable motors that weigh a little bit more than the military engines. The airways, with their landing fields, weather service, and radio telegraphy between airdromes, may be so organized that they will give more security than the railways with their block system, switches, and repair facilities. In fact, in Europe the commercial air service, carrying passengers and freight, has operated more miles with fewer casualties than have the railways during the past year.

"The airplane really originated in this country and today we hold the world's altitude record, the world's endurance record, and the world's speed record, and still our Government fails to support our aviation to the same extent that it is supported in the other leading nations of the world."

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## American Aviation Patents

*Granted Jan. 16, 1923*

1,442,155 Aircraft. Alexander Klemin, New York, N. Y.
1,442,169 Aircraft. Eddie Molloy, Roselle Park, N. J., and Edward Summers Jenkins, Glen Cove, N. Y., assignors to Alexander Klemin, New York N. Y.
1,422,323 Reenforced Fabric for Aircraft. Mittie Taylor Brush, Dublin, N. H.
1,442,345 Aircraft-Launched Temporary Drifting Mine. Charles L. Kee, Portsmouth, Va.
1,442,506 Aeroplane. William D. Wright, San Diego, Calif., assignor of one-half to A. B. Bowman, San Diego, Calif.

# Proposed Landing Field Nomenclature

*By Archibald Black and Donald R. Black*

Every new field of effort necessitates the creation of its own new terminology. This usually develops spontaneously in different localities and results in some confusion until the use of terms becomes more or less standardized. When we took up the study of air station work in the attempt to develop it as a branch of engineering, it was only natural to expect the confusion in present terminology which we found existing. Not only are terms in use both here and in Europe which have one meaning in one locality and a different one in another, but we also found that the creation of some new terms appeared unavoidable in the straightening out of present usages. In some papers on the technical features of landing fields and seaplane stations which we have had under preparation, we have encountered some confusion through the lack of uniformity in existing practice in the application of terms.

### *An Example of the Present Confusion*

An excellent example of this confusion is the use of the word "runway". This term is universally applied in this country to the part of the landing field which is generally used for take-off and landing. Unfortunately, however, this same term is also applied to some extent, to the structure or path provided at air stations for launching or hauling out of seaplanes. While this one term has already caused some confusion, many similar cases could be pointed out. As the term "ways" or "launching ways" is already in use in marine work as applied to similar paths or structures, it would seem only logical to apply it also to those provided for seaplanes. We have accordingly adopted the use of the term "ways" when referring to seaplane launching tracks or paths.

In order to obtain some semblance of order in the use of each of the terms, we compiled a list of every one which we considered to be in sufficiently general use to justify its consideration. An attempt was then made to define each, holding in mind both its generally understood meaning as applied in air station work and its meaning in any other field of work where it might come into use. The accompanying system of nomenclature is the result of this study and is presented for comment by those interested. The authors would be glad to receive any suggestions or criticism of the system as outlined in order that they may bring their use of each term into conformance with that practice which may be most generally favored.

Just at this time a sub-committee of the Aeronautical Safety Code Committee is drafting some general rules for airplane landing fields and airports. It would, therefore, appear that this is a most appropriate time to straighten out the present confusion in our nomenclature. The sooner this confusion is remedied, and meanings clearly defined, the sooner will we reach uniformity in the use of each of the terms. If the matter is neglected until this Safety Code is completed, many inconsistencies will be perpetuated indefinitely. For the present, until some body such as the National Advisory Committee endorses a nomenclature, we propose to bring any of our work into line with the system given herewith. In the meantime general comments should help to clear up any points which we have missed or have failed to properly cover.

Following is the nomenclature proposed in connection with air stations:

AIRDROME—an air terminal (term practically obsolete in U. S.)

AIR HARBOR—a Canadian term for an air terminal.

AIRLINE—an organization operating aircraft, more or less regularly, over a prescribed course.

AIRPORT—an air station for water types of aircraft only.

AIR SERVICE—an organization operating aircraft over other than prescribed courses.

AIR STATION—a general term applied to any stopping place for aircraft which is provided with facilities for the reception of some type.

AIR TERMINAL—a main air station.

AIRWAY—the territory between two points which is provided with adequate landing facilities for aircraft.

APRON—the prepared surface in front of a hangar.

ARRESTING GEAR—a device for arresting the forward motion of airplanes after landing.

AUTOMATIC TEE—a T-shaped automatic wind indicator which is used at air stations to indicate to aircraft the direction of the wind.

BEACON—a powerful light used to mark air routes or air stations at night and which is designed particularly for long range navigation.

CATAPULT—a device for launching airplanes by projecting them into the air at their flying speed.

DOLLY—a small truck used to facilitate the handling of airplanes on the ground and particularly to carry the tail skids of such machines.

EMERGENCY LANDING FIELD—a field of such nature as to permit of emergency landings and subsequent take-off of airplanes.

EMERGENCY RUNWAY—a narrow strip of field of such nature as to permit of emergency landings of airplanes but which may not permit their subsequent take-off.

FAIRWAY—the clear stretch of water in the proximity of an airport which is used for the take-off and landing of seaplanes.

FLATTENING OUT—the act of flattening the glide of an airplane just before effecting a landing.

GROUND FLARE—a light, produced by combustion of a cartridge, used for night signalling to aircraft from the ground.

GROUND ORGANIZATION—the ground facilities and non-flying personnel used in the operation of an airline or air service.

HANDLING TRUCK—(N.A.C.A. defin.) a truck, mounted on wheels or sliding on ways, on which airplanes or seaplanes may be placed to facilitate moving them about and carrying them to and from their hangars.

HANGAR—(N.A.C.A. defin.) a shelter for housing aircraft.

INTERNATIONAL MARKER—a sign, used to facilitate identification of a town or locality from the air, constructed in accordance with the provisions of the International Air Convention.

LANDING FIELD—a field of such nature as to permit of airplanes or airships, or both, landing or taking-off and which is provided with facilities for their reception. An air station for land types of aircraft.

LANDING FLOODLIGHTS—a battery of floodlights used at air stations for illumination of all or part of the landing area during night landings.

LANDING GROUND LIGHTS—a system of lights on the surface of the landing area which is used to indicate at night the direction of the wind and the point at which the landing should be effected.

LANDING RUN—the run of an airplane over the ground while losing its momentum after effecting a landing.

LANDING TEE—a T-shaped movable marker used at air stations to indicate to aircraft the direction of the wind.

MAIN DOOR—the door of a hangar through which aircraft are moved into or out of the building.

MARKER—a sign provided at an air station to facilitate its identification from the air and which is also sometimes arranged to indicate the direction of the runways at landing fields.

MOORING RING—a ring set into the surface of landing fields to be used for mooring of airplanes or airships.

MOORING SPACE—an area on water or land set aside for mooring of aircraft.

MOORING TOWER—a device used for mooring of airships from their forward end and which permits their turning with the wind.

OBSTACLE LIGHT—a light used to mark obstacles to aerial navigation at night.

PARACHUTE FLARE—a light, produced by the combustion of a cartridge, carried by a parachute and designed for dropping from aircraft to render large areas of ground visible at night.

PILOTAGE LIGHT—a light used as a guide for local pilotage in the vicinity of an air station.

PORPOISING—the action of a seaplane in hopping from the crest of one wave to that of another while moving on the surface at high speed.

RUNWAY—a portion of an air station used for the take-off and landing of airplanes.

SERVICE FLOAT—a float used for the servicing of seaplanes.

SIDE-SLIP LANDING—a type of landing in which an airplane is side-slipped, during part of the glide to the surface, in landing. The angle of glide is thus increased without increasing the speed, enabling the landing to be made in a shorter distance than otherwise.

TAKE-OFF RUN—the run of an airplane during acceleration from a standstill to flying speed when taking-off.

TAXI—(N.A.C.A. defin.) to run an airplane over the ground, or a seaplane over the surface of the water, under its own power.

TENSIOMETER—an instrument used for measuring the tension in wires or cables.

WAYS—a path or track to the water, used for the launching or hauling out of seaplanes; abbreviation of LAUNCHING WAYS.

WHEEL CHOCK—a block used to prevent the wheels of airplanes from rolling while the engine is being run with the machine on the ground.

WIND CONE—a conical streamer, flown from the top of a mast, which is used at air stations to indicate the direction of the wind.

WING TIP FLARE—a light, produced by the combustion of a cartridge, carried under the wing tips of an airplane and designed for illumination of the ground or surface of water during night landings.

## Flying Boat Design and Construction

At a recent meeting of the Royal Aeronautical Society Maj. J. D. Rennie read a paper entitled "Some Notes on the Design, Construction and Operation of Flying Boats." The author mentioned at the outset that his paper was to be followed by two other papers on Seaplanes before the Royal Aeronautical Society: one by G. S. Baker of the National Physical Laboratory on Feb. 1 on "Ten Years Testing of Model Seaplanes" and another by Wing Commander T. R. Cave-Browne-Cave on Feb. 15 on "The Practical Aspects of the Seaplane." He therefore would not touch on the matters to be dealt with in those papers.

The chief object of his paper was to put on record the main results of the experience in flying boat design and construction gained at Felixstowe where he himself was Chief Technical Officer under the late Col. J. C. Porte, C.M.G., who was directly responsible for the development of the flying boat in the British Air Service, whose untimely death robbed the aeronautical world of one of its greatest pioneers. Frequently-expressed criticism of the flying boat, that in performance it is inferior to the airplane, is not true of large multi-engined boats; as was proved by comparative tests of an F5 flying boat and a Vickers Vimy-commercial airplane both fitted with two Rolls-Royce "Eagle" engines which showed that the boat carried 21.2 lb. per horse-power compared with 17.4 lb of the Vimy. A table comparing the weights of representative airplanes and flying boats was here thrown on the screen, which showed that the average percentage of "useful load" to "total weight" was higher in the case of the seaplanes. Three types of flying boats are in common use (1) exemplified by the F5 consists of a hull to which the wings and tail are attached direct and in which wing tip floats are employed; (2) the type, of which the American NC4 which crossed the Atlantic was an example, in which the tail unit was carried on separate outriggers; and (3) a type similar to the F5 except that wing tip floats were dispensed with by fitting a fin extending outward from the hull. He was confining himself to the first type and in particular to multi-engined boats with a "displacement" of more than two tons.

Dealing with the best position for rudders and the effect on the control of one or more engines failing Major Rennie stated that the arrangement in the large "Felixstowe Fury" triplane, with their propellers abreast and their rudders working in the respective "slipstreams" proved very satisfactory. He mentioned that it was not generally known, as a sidelight in the problem, that a stationary propeller offered a resistance of between 12 to 13 lb. per square foot of projected area.

As regards hull lines, tank tests afford the only reliable means of obtaining data with regard to resistance and hydroplaning efficiency and therefore Mr. Baker's papers before the same Society in a fortnight's time would be looked forward to with interest as the development of the technique of this form of experimentation is due almost entirely to his work in the William Froude National Tank at Teddington. Generally speaking deductions from flights in full scale machines agreed with those from the model experiments.

The fundamental points necessary to success in a flying boat hull are: (1) Avoidance of diving at low speeds. (2) Seaworthiness, (3) Hydroplaning efficiency, and landing with minimum shock, (4) Stability at high speeds on the water and (5) Ability to turn fore-and-aft to facilitate taking off and landing.

The lecturer then proceeded to describe in detail the gradual elevation of a satisfactory flying-boat hull at Felixstowe seaplane station culminating in the "Felixstowe Fury," which proved itself capable of lifting 14½ tons. Improvements gradually introduced included a V-shaped undersurface to the bow with a flat bottom to the rear portion, and two or more "steps" at intervals with plenty of beam. Generally speaking the larger the hull the more seaworthy it will be. For a given displacement increase in all dimensions passing from a 35 ft. to a 46 ft. hull decreased the maximum horse-power by 26 per cent while the weight of the hull increases 75 per cent. In all cases decrease of beam increases the maximum horsepower required on the water.

The various types of hull construction may be divided into three classes: the "Porte" or fuselage type of braced framework, the "Linton Hope" flexible type and the more or less flat-sided box type. A detailed description and discussion of the points of advantage and disadvantage of each type was then given.

## New Seaplane Speed Record

On Dec. 28, 1922, the Italian Pilot Passaleva, flying a Savoia S51 flying boat, established a new world's speed record for seaplanes, at Sesto Calende, Lago Maggiore, Italy.

Flying over a 1 kilometer course twelve times he made each passage in the following time:

| | | | |
|---|---|---|---|
| 1 | 13 sec. | 7 | 12 3/5 sec. |
| 2 | 13 1/5 " | 8 | 13 2/5 " |
| 3 | 12 3/5 " | 9 | 12 4/5 " |
| 4 | 13 " | 10 | 13 " |
| 5 | 13 " | 11 | 12 4/5 " |
| 6 | 13 3/5 " | 12 | 13 " |

The four last attempts were selected, giving an average of 12 19/20 sec. per kilometer, or 277.992 kilometers per hour, or 172.716 m.p.h. This record was made officially in the presence of delegates of the Italian Aeronautical Federation and of the International Aeronautical Federation, and in all probability will be approved by the latter as an official record.

The Savoia S51, which competed in the Schneider Cup Race at Naples in August, 1922, was designed by Engineer Marchetti of the Savoia firm. It is purely a racing machine and is equipped with one Hispano-Suiza 300 hp. engine.

# New Aircraft at the Paris Aero Exposition

## Additional Descriptions of New Aircraft with Special Reference to the Pescara Helicopter

*(Concluded from the last issue)*

### *Borel*

The Borel Company exhibited a two-seater observation plane (Model CAP2) of fairly orthodox appearance.

In general form it is a staggered biplane, lower wing of smaller chord but equal span to that of the top, with two bays of bracing on each side. The pilot sits under the rear spar and the observer is behind that.

The fuselage is of the normal wire braced type, duralumin tubes replacing the usual wooden longerons.

The wings are built on duralumin box spars, and the ribs are made with channel section flanges and sheet distance pieces—as close a translation of wooden construction into metal as one could reasonably expect to achieve. All joints are steel plates. The internal drag bracing of the wings is steel wire.

The engine is a Rateau Supercharged Hispano of 300 hp., fitted with a built-in "Odier" starter.

SPECIFICATION OF BOREL CAP2

| | | | |
|---|---|---|---|
| Span | 13 m. | Weight loaded | 1750 kg. |
| Length | 8.17 m. | Speed sea level | 200 km.h. |
| Height | 2.58 m. | Speed 4000 m. | 240 km.h. |
| Wing area | 39 sq. m. | Landing speed | 102 km.h. |
| Weight empty | 1000 kg. | Ceiling | 10000 m. |

### *Latecoere*

The Latecoere firm, which incidentally operates the Toulouse to Morocco airway, has been experimenting with machines of its own design and construction for some two years past. At the preceding Salon it exhibited a single-engined and a three-engined passenger carrier, but these do not appear to be in use by their air line, for the latter still employs Breguet biplanes. Furthermore the Latecoere Air Line has just purchased six Caudron C61 airplanes for its Moroccan service.

The machine shown at this year's Exposition was a four-engined all-metal bomber, LAT6, which had already been exhibited last year. Some minor refinements have been added to it, and the three engines of the original model have been replaced by four Salmson 250 hp. engines placed in two wing nacelles with tandem propellers.

### *Savoia (S.I.A.I.)*

The *Società Idrovolanti Alta Italia* of Sesto Calende, Italy, exhibited its latest commercial flying boat, the Savoia 53, which was designed by Eng. Marchetti. This boat is equipped with a 300 hp. Fiat 12A-bis engine and seats six passengers beside the pilot.

The wing structure is a normal two bay biplane with two bays of bracing per side. The engine is well cowled, and is carried rather high up in the gap. It drives a four-bladed pusher propeller. The seats of the machine are arranged in three rows, all ahead of the wing, the rear row having three seats, while the pilot and one passenger are seated in the middle row. The boat hull is built of plywood and is of very pleasing lines.

SPECIFICATION OF THE SAVOIA 853

| | | | |
|---|---|---|---|
| Wing area | 65 sq. m. | Max. speed | 160 km.p.h. |
| Weight empty | 1750 kg. | Min. speed | 80 km.p.h. |
| Weight loaded | 2550 kg. | Climb to 2000 m. | 19 min. |

### *Schneider*

The Schneider firm, the principal French manufacturer of guns and armor plating, made its first appearance at the Paris exposition by exhibiting a large metal night bomber fitted with four 370 hp. Lorraine-Dietrich engines.

Constructionally this machine bears a certain resemblance with the huge multi-engined Zeppelin bombers which were brought down in France toward the end of the war, and as a matter of fact the designs of the Schneider BN2 date back to 1918. The machine is chiefly of interest on account of the extensive use of high-resistance light-weight steel alloys in its construction. The spars are stamped chrome-nickel steel girders of U shape, upon which lattice ribs of alloy steel are mounted. The wings are built in three sections, the center section having straight leading and trailing edges, while the external wing section are strongly swept back. The engines, mounted in tandem, are encased in neat cowlings. The fuselage is built of high tensile steel tubes which are assembled by means of riveted sheet steel stampings.

SPECIFICATION OF THE SCHNEIDER BN2

| | | | |
|---|---|---|---|
| Span | 30.00 m. | Weight empty | 6500 kg. |
| Length | 19.90 m. | Weight loaded | 10020 kg. |
| Chord | 3.80 m. | Max. speed | 160 km.p.h. |
| Gap | 3.90 m. | Ceiling | 4500 m. |
| Wing area | 220 sq. m. | Range | 750 km. |

### *Pescara Helicopter*

The Pescara helicopter was the only aircraft of its kind shown at the Paris exposition. This is the third helicopter built by M. Pescara, who has been pursuing the development of a direct-lift machine since 1919, when he built his first type in Barcelona, Spain. Although the results obtained with the latter machine were inconclusive, some of the constructional features greatly impressed a technical commission of the French air department which reported on it. Following this report the French government decided to grant M. Pescara financial assistance for the further development of his ideas, and the resulting work has since been conducted at the Villacoublay airdrome, near Paris.

The second Pescara helicopter, F2, which resembles the latest type in its general lines, although it differs from it in many details, was tested last summer in an airship hangar, when it lifted off to a height of three or four feet. No particulars are available regarding these tests, but from published photographs it would seem as if the F2 somewhat lacked the inherent stability which it was claimed to embody. This machine was illustrated in the May 1, 1922, issue of AVIATION.

The Pescara F3, which is shown in the cover illustration of this issue, is like the previous models of this constructor a "one master" helicopter, that is the lifting screws are concentrically arranged around a single mast. The system of sustentation consists of two four-bladed biplane propellers of 7.20 m. diameter, 0.60 m. gap, and 27 sq. m. total supporting area, which are driven through a leather cone clutch and a differential reduction gear by a Hispano-Suiza 180 hp. engine. The latter is mounted together with fuel and oil tanks in the nose of a streamline fuselage (shown in skeleton form at the Paris exposition) which carries in the middle the propeller mast. The pilot cockpit is behind the mast, and from there the fuselage tapers toward the stern post which carries a Lamblin radiator and rudder. The latter was not mounted on the show machine.

The fuselage is built of channel section duralumin longerons and cross frames riveted together over gusset plates. The landing gear is built of duralumin tubing, the wheels being rubber sprung. The mast is a steel tube, and carries inside two driving shafts which are actuated from the engine through a differential reduction gear which makes the two biplane screws turn in opposite directions at the same speed as long as the pitch (incidence) is the same for the two sets of blades. The blades of each screw are built around a single steel spar with stamped duralumin ribs, and are fabric covered. The incidence, or pitch, of the screws can be changed by rotating the blades around the spar. This is effected by means of a lever acting on the interplane bracing wires, which are led over pulleys whereby the truss parallelogram can be twisted to suitable incidence. As the interplane struts

increase in length not only from the hub to the tip of the screw but also with respect to one another, the trailing struts being longer than the leading struts, it will be seen that the wing or screw blade will retain a helicoidal form at any incidence. The leading interplane struts are steel tubes; the trailing struts are duralumin tubes.

The Pescara helicopter is controlled by three organs, namely, two levers and a steering wheel.

One of the levers, called "general incidence lever," effects all *simultaneous* changes in incidence in both screws, and is employed for increasing and decreasing the incidence when taking off and landing, respectively, and for controlling evolutions in the vertical plane.

The second lever corresponds more or less to the "joystick," and controls horizontal flight in rectilinear direction. This is accomplished by creating an eccentric thrust which inclines the machine in the direction of flight. In this maneuver the tips of *each* screw are differentially warped in such manner that their incidence has a maximum value when the blade passes in front of the machine, and a minimum value when the blade reaches the rear of the machine. The thrust component consists in this case of two forces: one, vertical, which is opposed to the weight of the machine and which practically balances it as the incidence is small; and the other, horizontal, which is unbalanced until the machine assumes the speed at which the resistance of the air will balance it. The horizontal control lever is also employed for stabilizing the machine in gusts, its action in this case being similar to that of the ailerons of an airplane, save that on the helicopter the warp is used to counteract disequilibrating couples in whichever azimuth they occur.

The third control organ is a steering wheel by means of which the pilot can make the machine turn in the horizontal plane, for, as was said before, the horizontal flight lever only controls *rectilinear motion* in the horizontal plane. The steering wheel acts differentially on the two screws with respect to one another, but uniformly on all four blades of each screw. This means that if the incidence of the upper screw is *increased,* this increase will be uniform on all four blades—as against the differential increase effected by the horizontal control lever—while the incidence of the lower screw will remain similarly uniform except that it will be *decreased.* In this maneuver the total thrust of the two screws remains the same, but as the resistance of the screw having the smaller incidence will be less than that of the other screw, it will turn faster and so swing the machine around.

In case of engine failure the Pescara helicopter is supposed to descend like a parachute, the free rotation of the screws giving, at a slight negative angle, a sufficient upward thrust to insure a safe rate of descent. This rate is calculated as 33 ft. per second, but the inventor believes that it will be possible to reduce it to about 10 ft. per second when close to the ground by suddenly increasing the incidence of the screws. Such a maneuver would correspond to the "pull-up" of airplanes on landing.

To date the Pescara helicopters have only demonstrated their ability to lift off the ground—a feature which a dozen other direct lift machines have done since the first experiments of M. Bréguet, in 1909—but they have yet to furnish proof of their stability or their ability to fly horizontally.

## Bibliography on Helium

A large amount of scientific literature has been written about helium. With a view to making this literature more available to those who are interested in it, the Bureau of Standards of the Department of Commerce has issued a circular giving a list of all this literature. It is Circular No. 81, entitled "Bibliography of Scientific Literature to Helium", and may be obtained from the Superintendent of Documents, Government Printing Office, Washington, D. C., at 5 cents a copy.

About 600 publications are listed, and they are so arranged under various headings that the reader may easily follow the historical development of any branch of the subject in which he is interested.

## Presentation of Collier Trophy

In the presence of Postmaster General Work and numerous Air Mail and Air Service Officers, Bernard H. Mulvihill, resident vice president of the National Aeronautic Association of U.S.A., on Feb. 5 formally presented the Collier Trophy to the personnel of the Air Mail Service which it was awarded for the greatest achievement demonstrated in the use of aviation in America for the year, 1922. The ceremony took place at Bolling Field.

With Postmaster General Work were: First Assistant Postmaster General John H. Bartlett; Second Assistant Postmaster General Paul Henderson, in charge of Air Mail; Third Assistant Postmaster General Warren I. Glover; Fourth Assistant Postmaster General Harry H. Billany; Carl F. Egge, General Superintendent of Air Mail, a large staff of superintendants and Assistant Superintendants, and Air Mail Pilots.

The Army was represented by Maj. Gen Mason M. Patrick, Chief of Air Service; the Navy by Admiral W. A. Moffett, Chief of the Bureau of Aeronautics, Navy Department; and the Marine Corps by Lt. Col. T. C. Turner, Chief of Marine Corps Air Service.

Mr. Mulvihill was accompanied by the Collier Trophy Committee of the National Aeronautic Association, Lieut. Col. Frank P. Lahm, Porter H. Adams of Boston, vice president and governor of the First District, B. Russell Shaw, vice chairman of the Committee, and Dr. George W. Lewis, executive officer of the National Advisory Committee for Aeronautics, and chairman of the Collier Trophy Committee, who flew from New York in a mail plane, piloted by Harold T. Lewis, Air Mail Pilot, and in whose custody the trophy was brought from New York.

In making this award, the Collier Trophy Committee stated that:—

"The wonderful achievements of the Air Mail Service in completing a year's operation along the different routes from coast to coast, and in all conditions of weather, without a single fatal accident, is, in the committee's opinion, the greatest achievement in aviation made in the past year. This performance denotes substantial progress in the practical application of airplanes to the purposes of commerce and other peaceful pursuits. This excellent performance has been attained through the development by the Air Mail Service of an inspection and operating system which made possible the most successful demonstration of the practical application of airplanes for commercial purposes."

## Aero Club of Minneapolis

The Aero Club of Minneapolis, which publishes an excellent little house organ called *Contact,* recently opened its new quarters on the second floor of the new Aero Club Building, Second Ave., South and Ninth St., Minneapolis.

The new quarters are extremely comfortably furnished, and comprise a lounge, a cafe, a library, club offices, director's room, card room, dormitory rooms and a kitchen. The latter is a particular object of pride for the members, as really good restaurants seem rather scarce in Minneapolis.

As Minneapolis furthermore boasts a first class airport in Speedway Landing Field, the city seems to be just the place at which to have a forced landing.

## Flying Officers Command a British Army

Vice Air Marshal Sir. John Salmond, R.A.F., has been placed in command of all the British forces in Mesopotamia; and Air Commodore L. E. O. Charlton, for three years after the War British Air Attaché at Washington, has been assigned as Chief of Staff with the forces in the Near East.

Both officers distinguished themselves with the Royal Air Force; and it is significant of the wide importance being attached to the aerial arm that general officers are now being appointed from the flying branch.

# Official World's Records for the Year 1922

## As Recognized by the International Aeronautic Federation

The Contest Committee, National Aeronautic Association of U.S.A., has issued the following list of official world's records for the year 1922 as recognized by the International Aeronautic Federation (F.A.I.).

As will be seen, the world's official duration record for Class C Aircraft (Airplanes) is held by the French pilots Bossoutrot and Drouhin with 34 hr. 19 min. 7 sec. Lieuts. Oakley G. Kelly and John A. Macready, A.S., on Oct. 5-6, 1922, remained aloft 35 hr. 18 min. 30 sec. in an Army-Fokker Transport, but their performance was not homologated by the N.A.A. as it was not made in accordance with F.A.I. rules.

*CLASS A. SPHERICAL BALLOONS*

*1st Category (21,189 cu. ft. maximum)*

1. DURATION:
George Cormier (July 1, 1922), 17 hr. 32 min. 25 sec.
2. DISTANCE:
George Cormier (July 1, 1922), 499.69 miles.

*2nd Category (21,224 cu. ft. to 31,783 cu. ft.)*

1. DURATION:
Jules Dubois (May 14-15, 1922), 23 hr. 28 min.
2. DISTANCE:
E. Demuyter, Brussels-Hamburgh-Ulzen (Feb. 20-21, 1922), 303.23 miles.

*3rd Category (31,818 cu. ft. to 42,377 cu. ft.)*

1. DURATION:
E. Demuyter (May 14-15, 1922), 22 hr. 55 min. 40 sec.
2. DISTANCE:
E. Demuyter (May 14-15, 1922), 239.3 miles.

*Records regardless of Category*

1. DURATION:
H. Kaulen (December 13-17, 1913), 87 hr.
2. DISTANCE:
Berliner (Feb. 8-19, 1914), 1896.86 miles.
3. ALTITUDE:
Süring & Berson (June 30, 1901), 35,434.8 ft.

*CLASS B. AIRSHIPS*

1. DURATION:
Castracane & Castruccio, P5 (June 25, 1913) 15 hr.
2. DISTANCE:
Castracane & Castruccio, P5 (July 30, 1913) 493.31 miles.
3. ALTITUDE:
Cohen, "Conté", (June 18, 1912) 10,105.5 ft.
4. MAXIMUM SPEED:
Castracane & Castruccio, P5 (July 30, 1913) 40.22 m.p.h.

*CLASS C. AIRPLANES*

1. DURATION:
Lucien Bossoutrot & Maurice Drouhin at Bourget, Goliath-Farman, with two 300 hp. Renault motors (Oct. 14-15, 1922) 34 hr. 19 min. 7 sec.
2. DISTANCE:
Lucien Bossoutrot & Jean Bernard over course from Villesauvage to la Marmogne, in Goliath-Farman airplane, with two 260 hp. Salmson motors (June 3-4, 1920) 1190.04 miles.
3. ALTITUDE:
Lt. Macready at Dayton, Ohio, (Sept. 28, 1921) Lepere biplane, Liberty motor, 400 hp., 34,509.5 ft.

4a. SPEED OVER 100 KILOMETERS:
Lt. Maughan at Detroit (Oct. 14, 1922) Curtiss plane, 275 hp. Curtiss motor. 18 min. 6 sec. 78/100.

SPEED OVER 200 KILOMETERS:
Lt. Maughan at Detroit (Oct. 14, 1922) Curtiss plane, 275 hp. Curtiss motor. 36 min. 12 sec. 17/100.

SPEED OVER 500 KILOMETERS:
Lucien Bossoutrot at Bourget in Farman F90, 300 hp. Salmson motor (Nov. 15, 1922) 3 hr. 35 min. 36⅘ sec.

SPEED OVER 1000 KILOMETERS:
Lucien Bossoutrot & Jean Bernard (June 3-4, 1920) over the course from Villesauvage to la Marmogne in Goliath-Farman, with two Salmson motors, 260 hp. 10 hr. 19 min. 46 sec.

SPEED OVER 1500 KILOMETERS:
Lucien Bossoutrot & Jean Bernard (June 3-4, 1920) over the course from Villesauvage to la Marmogne in Goliath-Farman, with two 260 hp. motors. 16 hr. 42 min. 8 sec.

4b. HIGH SPEED OVER ONE KILOMETER:
Brig. Gen. Mitchell at Detroit (Oct. 18, 1922) in Curtiss plane, 275 hp. Curtiss motor. 222.97 m.p.h.

*RECORDS CARRYING USEFUL LOAD*

1. DURATION: 1500 kilos (3,306.9 lb.)
Capt. C. T. R. Hill, at Cricklewood, England, (May 4, 1920) Handley Page (W8) airplane with two 450 hp. Napier Lion motors, 1 hr. 20 min.
3. ALTITUDE: 250 kilos (551.01 lb.)
Jean Le Boucher at Bourget (July 6, 1921) in Brequet-Rateau plane, 280 hp. Renault motor. 22,251.7 ft.

ALTITUDE: 1,500 kilos (3,306.09 lb.)
Capt. C. T. R. Hill at Cricklewood, England (May 4, 1920) in Handley-Page (W8) airplane with two 450 hp. Napier Lion motors, 14,000 ft.

*CLASS C (2) SEAPLANES*

1. DURATION:
Biard at Naples (Aug. 12, 1922) in Supermarine, 450 hp. Napier-Lion motor. 1 hr. 34 min. 51⅗ sec.
2. DISTANCE:
Biard at Naples (Aug. 12, 1922) in Supermarine, 450 hp. Napier-Lion motor. 230.39 miles.

4a SPEED OVER 100 KILOMETERS:
Biard at Naples (Aug. 12, 1922) in Supermarine, 450 hp. Napier-Lion motor. 28 min. 41⅖ sec.

SPEED OVER 200 KILOMETERS:
Biard at Naples (Aug. 12, 1922) in Supermarine, 450 hp. Napier-Lion motor. 57 min. 37⅖ sec.

*CLASS D. GLIDERS*

1. DURATION:
Maneyrol, Alexis, at Itford Hill (Oct. 21, 1922) 3 hr. 21 min. 7 sec.

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## American Entrants, G.B. Balloon Race

The Contest Committee, National Aeronautic Association, advises that although the closing date for entries in the Gordon Bennett Balloon Race is set for March 23, 1923, it is only necessary for the N.A.A. to notify the Aero Club of Belgium before that date of the *number* of American entrants. This ruling will enable the N.A.A. to hold the annual National Balloon Race for the purpose of selecting by elimination the three pilots who will enter the international race. The maximum number of entrants allowed any country affiliated with the F.A.I. is three.

The N.A.A. is in receipt of a cablegram from the F.A.I. stating that the N.A.A. has until July 23 to announce the names of the pilots entered and of their alternates.

This year's Gordon Bennett Balloon Race will take place on Sept. 23, at Brussels, Belgium.

# French Pilots Make New Gliding Records

## Maneyrol Stays Up 8 hr. 5 min.; Barbot 8 hr. 37 min.

The 7 hr. 3 min. flight made by Lieutenant Thoret of the French army did not remain for long the world's record for motorless flight. Two new performances, made at Vauville, near Cherbourg, France, where the second French sailplane meet will be held next August, and at Biskra, Algeria, have brought up the record to 8½ hr. This is truly an amazing advance considering that the world's record which Herr Harth established in the fall of 1921 was only 23 min.

The first of the new records was made Jan. 29 by Alexis Maneyrol on the Peyret tandem monoplane with which he made the 3 hr. 21 min. world's record at Itford Hill, England. Maneyrol took off at 1.15 p. m., after having had fires laid on the beach near the landing ground. When darkness came the fires were lighted, and the aviator guided his glider by the flare. A strong wind was blowing and the machine rocked considerably, diving at times in downgusts, but the pilot kept it well under control. At 9.20 Maneyrol descended. The landing was difficult, a wheel being broken in the operation. His time in the air was 8 hr. 5 min.

### *The Latest Endurance Glide*

Two days later, on Jan. 31, the pilot Barbot, who flew a Dewoitine glider at the Combegrasse meet, last summer, bettered Maneyrol's latest record by 31 min., remaining in the air 8 hr. 36 min. 55 sec. This performance was made during the sailplane meet at Biskra, Algeria.

The cable dispatches describing this flight fail to state with what type of machine it was made, but it appears to have been a glider, for its wing loading is given as 13 kg. per square meter (2.6 lb. per sq. ft.). Another contestant, Sub-Lieutenant Descamps, took the air shortly after Barbot took off, but he succeeded in remaining up "only" 4 hr. 12 min. as his glider appears to have been too lightly loaded for the high wind (12-15 m. per second) which was blowing.

It is probable that both these performances were made according to F.A.I. rules and will be homologated, for the Biskra meet was run under the regulations of the Aero Club of France, while Maneyrol was one of a committee appointed by the French Aerial Association sent to Cherbourg to investigate soaring conditions. On the other hand it seems unlikely that Lieutenant Thoret's 7 hr. flight will be homologated, for it was made with an airplane—a Hanriot HD14 equipped with a 80 hp. Le Rhône engine—and not with a glider. American contenders for soaring honors would do well to familiarize themselves with the amended Art. 31 of the F.A.I. rules which defines a motorless flying machine as follows:

"A form of aircraft supported in the air by dynamic reaction, but devoid of a mechanical motor that may contribute to its sustentation and propulsion."

It seems evident that this definition does not cover airplanes even though no use be made of the engine during a gliding flight. Hence a gliding flight made with an airplane which is temporarily deprived of its power plant cannot be homologated under Class D Aircraft (Gliders).

### *Lieut. Thoret's Exploits*

Regarding Lieutenant Thoret's 7 hr. flight some interesting particulars are now on hand. The Hanriot school machine which he used for this performance has a normal wing loading of 22.5 kg. per sq. meter (4.6 lb. per sq. ft.) when carrying pilot, passenger and 3 hr. fuel. Without the passenger and with but a small amount of fuel in the tanks, the wing loading can probably be lowered to about 3.9 lb. per sq. ft., which figure is still far in excess of that customary in gliders.

Lieutenant Thoret was sent to Algeria by the French air department to investigate soaring conditions and select a site for the Biskra sailplane meet. After having familiarized himself with local wind conditions, by making various flights partly gliding and partly with the engine throttled way down, he decided to attempt a motorless flight of long duration. Starting from the ridge at Delouatt he made two attempts on the morning of Jan. 3, but finding that the air would not carry him without the engine, he landed and waited until the wind would strengthen. When the wind was blowing at 10-12 m. per second, he took off (with engine on) for the third time and cut the motor when well over the ridge. Like Maneyrol at Itford Hill, Thoret started "tacking" to and fro along the ridge over a distance of about 5000 ft., taking 55 sec. in one direction and 76 sec. in the other. This time he found no difficulty in remaining aloft, but he was blown about a good deal by the wind, approaching at times within 30 ft. of the rocky sides of the ridge in front of which he was tacking. This ridge is 740 ft. high and is situated at about 5 miles southwest of Biskra. His greatest difficulty was to fight off fatigue due to the monotony of flying up and down the ridge for hour after hour, and, toward the end of the day, to keep warm. When it came near sundown and the temperature dropped, soaring conditions became less favorable, and the pilot decided to land. This he did at 4 p. m., having remained aloft for 7 hr. 3 min.

A few days later Lieutenant Thoret remained aloft with his mechanic 1 hr. 9 min.

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## Good Field and Service at St. Louis

Harry H. Perkins, secretary of the Robertson Aircraft Corp., 5248 Oakland Ave., St. Louis, Mo., writes:

"Our organization is now at Lambert Field, in St. Louis county. We have a 183 acre field, marked with a circle and landing T. It is a four-way field. Visiting planes and pilots are cordially invited. No charge whatsoever is made. Our superintendent lives at the field, thus insuring a 24 hour service. There is a complete repair shop and storage facilities."

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## Aeronautical Chamber of Commerce

At a meeting of the Board of Governors of the Aeronautical Chamber of Commerce, Jan. 12, Allan Jackson, Vice President of the Standard Oil Co. (Indiana) was elected a Governor.

## Resignation of Alexander Klemin

Alexander Klemin has resigned as Director, Vice-President and Chief Engineer of the Cox-Klemin Aircraft Corp., and will resume an independent position in the field of aeronautics. The work of the Cox-Klemin Aircraft Corp. is being continued with Charles L. Cox in active control.

Mr. Klemin's experience with the company has been valuable to him from a technical standpoint, and no doubt will assist him in the work of aeronautical instruction and investigation which he is about to undertake.

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## Gallaudet Aircraft Plant Active

Frank B. Rhodes, advertising manager of the Gallaudet Aircraft Corp., at East Greenwich, R. I., stated on Dec. 26, according to a Providence newspaper, that the plant was running at full capacity, employing about 215 persons.

## As Others See Us

*From "Flight" (London):*

"To those who follow at all closely the progress in aviation, the enormous steps made recently by the United States in the matter of sporting aviation cannot have failed to impress by their significance. Although America was the country which gave flying to the world, it was nevertheless the fact that never, after other countries commenced to take up aviation, did America approach again to the leading position which the work of the brothers Wright should have given her. During the War, America built machines mainly to designs supplied by France and England. Since the War, with the exception of some very successful air mail services, America at first did very little in the matter of commercial aviation, due chiefly to the lack of uniformity in the air legislation of the various states of the union. Recently, however, America has leapt to the very front rank in sporting aviation, and, whatever pessimists may think, such performances have a very great effect on the prestige of a country.

"A couple of years ago, France was the only country in which international speed races of any importance were held annually. Then America decided to hold her Pulitzer race, and at once several very fast machines were produced. In last year's Pulitzer a number of machines were entered by the Navy and Army air services, and what has been the immediate result? All the world's speed records have passed to the United States. Lieutenant Maughan, on an Army-Curtiss is the holder of the world's speed record over 100 and 200 km.—records previously held by Brach Papa and Kirsch respectively. The world's speed record over 1 km. is now held by General Mitchell, Assistant Chief of the Army Air Service, after having stood to the name of French pilots for more than ten years. The world's altitude record is also held by an American pilot—Lieutenant Macready.

"It is all very well to say that these are but sporting efforts and 'cut no ice.' They do cut a very great deal of ice. When other nations are contemplating the purchase of machines, they will, undoubtedly, turn to the country which holds nearly all the world's records, other things being equal, as the mathematicians say. Not only so, but in the process of designing, building and flying these record-breaking machines America is learning a very great deal, which can be and will be incorporated in other designs, either of military or commercial nature. Thus both aerodynamically and constructionally progress will be made, which will further increase the prestige of her aviation industry.

"The question now arises, how did this sudden leap into the very front rank of sporting aviation come about. We think the answer can only be: Because America's air services supported, by direct orders to constructors and participation in the race, sporting events. In this country, R.A.F. pilots are allowed to fly in sporting events, but there is always the feeling that 'it really isn't done, don't you know,' and as for the participation of Service machines, there is a general holding up of hands and shaking of heads. 'Air Ministry machine, you know,' 'Government property,' 'Might get smashed,' and so forth. Isn't it time we reconsidered the whole position, and tried to learn a little from our more broad-minded cousins across the 'Pond'?"

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## Analysis of Stresses in German Airplanes

### N.A.C.A. Report No. 143

This report, by Wilhelm Hoff, contains an account of the origin of the views and fundamental principles underlying the construction of German airplanes during the war. The report contains a detailed discussion of the aerodynamic principles and their use in determining the strength of airplanes, the analysis of the strength qualities of materials and in the construction, the calculated strength of air flows and a description of tests made in determining the strength of airplanes.

A copy of report No. 143 may be obtained upon request from the National Advisory Committee for Aeronautics, Washington, D. C.

## British Airway Subsidies

The following interesting particulars on the subsidy scheme for British airway enterprises have been received from Wing Comdr. C. M. G. Christie, R.A.F., British air attaché in Washington, D. C.

The subsidy scheme provides for two kinds of subsidy: first, purchase subsidy, and second, operational subsidy, and these in turn are worked as follows:

***Purchase Subsidy***

Approximately one half of the aircraft and engines of the subsidised companies have been provided by the Air Ministry.

In 1923, 30 per cent of the companies' expenses for the replacement of machines will be borne by the Air Ministry, up to a maximum grant to each company of £15,000.

***Operational Subsidy***

(a) A lump sum is paid to each company on condition that a certain minimum number of flights or miles of flight are carried out during the year. The grants for 1922 are as follows:

*London-Paris route.*

To Messrs. Handley Page Transport, Ltd.:—£15,000 in return for 300 efficient flights each way between London and Paris.

*London-Brussels-Cologne route.*

To Messrs. Instone Air Line, Ltd.:—£25,000 in return for 300 efficient flights each way between London and Cologne.

*Manchester-London-Amsterdam (-Berlin) route.*

To Messrs. Daimler Hire, Ltd.:—£55,000 in return for 250,000 miles flown in the course of efficient flights over the Manchester-London-Amsterdam (-Berlin) route.

(b) In the event of any company failing to fulfil the requirements as to flights or miles flown, the grant is reduced pro-rata according to the deficit in flying.

***General Conditions***

(a) The companies are free to increase the frequency of the service beyond that corresponding to the number of flights or flying miles specified, but no subsidy is granted for such additional flying.

(b) An "efficient" flight is one which is completed within a time limit corresponding to a minimum ground speed of 60 m.p.h.

(c) The insurance of machines and their equipment with wireless apparatus is compulsory.

(d) The tariffs charged by the companies must be approved by the Air Ministry.

(e) The Air Ministry reserves the right to amend the amount of subsidy, or to withdraw the subsidy if the service operated is unsatisfactory.

(f) The sum total of the subsidies paid by the Government for civil air transport is at present limited to £200,000 per annum.

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## Concerning the Winslow Bill

The Hon. Samuel E. Winslow, Chairman of the House Committee on Interstate and Foreign Commerce, has notified the Aeronautical Chamber of Commerce that his bill, the Civil Aeronautics Act of 1923 (H.R. 13715) has been referred to a special sub-committee consisting of the following:

Samuel E. Winslow, of Massachusetts, Chairman ex-officio.
Everett Sanders, of Indiana.
Schuyler Merritt, of Connecticut.
Carl E. Mapes, of Michigan.
Homer Hoch, of Kansas.
George Huddleston, of Alabama.
Clarence F. Lea, of California.

The Chamber understands that, *if sufficient interest is manifested by those who are seeking Air Law,* H.R. 13715 can be reported out as an amendment to the Wadsworth Bill (S.3076) and passed at this session of Congress, thus assuring National Air Law before March 4.

It is urged that all who are interested in the early passage of this Bill communicate their views *at once* separately to each member of the Special Sub-committee.

## Rumpler Service in 1922

An interesting review of the *Rumpler Luftverkehr* for 1922 was printed in the Muenchener Neueste Nachrichten, according to a cable from Vice Consul Halsted, at Munich. The Rumpler company, established in 1919 soon after the Armistice, maintained a fairly regular service during the summer months. In 1920 special flights were organized for the exhibitions at Leipzig, Breslau and Frankfurt; many passengers were carried to the fair especially from Munich.

The service was begun with small planes, originally designed as two-seaters, but adapted to accommodate two passengers. During 1919 the Rumpler service maintained a mail service from Munich to Vienna, but political difficulties intervened and the chief run is now from Augsburg to Berlin, with Munich as the center of the service.

A total of 115,620 kilometers was flown on the Augsburg-Berlin route during the first eight months of 1922, and except when a strike intervened in April, it was apparently continuous. During this time 1205 passengers and 2706 kilograms of mail were transported. When the railroad strike occurred in February the Rumpler air service was the only means of transporting urgent mail between North and South Germany, the report states. In October the headquarters of the service were transferred to Munich, where, aside from the regular trips, planes are always available for special flights. Including special trips and private excursions the Rumpler service carried over 3655 passengers in 1922. Larger planes had to be put on the runs after the Leipzig Fair, and a number of Junkers cabin planes were purchased.

In February this company plans to develop a regular service between Munich and Vienna as well as a line to Leipzig.

## Standardization Conference

A conference to determine the desirability of unifying engineering abbreviations and symbols has been called by the American Engineering Standards Committee in the Board Room of the American Society of Mechanical Engineers, Engineering Societies Building, New York City, at 10 a. m., Tuesday, Feb. 13.

The need for the standardization of abreviations is emphasized by the existing confusion resulting from the variety of symbols for one thing and the multiplicity of meanings of one symbol. The expression "pounds per square inch," for instance, may be represented by at least a half dozen abbreviations. Some English journals use "h.p." for "high potential," whereas in the United States it is generally used to mean "horsepower." Whether or not the letters h.p. should be capitalized or hyphenated is not agreed. The mark ″ may mean inches, seconds, or a quotation.

Great confusion necessarily occurs due to the use of three or more different symbols for the same thing. The economies which will be gained by eliminating these ambiguities will be very great both for the student and for the engineer who must refer to the varied literature of a technical subject. American standardization of engineering symbols and abbreviations should also eliminate the difficulty which foreign engineers have in correctly translating English articles into their own language, when they find widely divergent practices in the use of abbreviations.

## Final Audit of Maynard Meet

S. G. Gumpertz, one of the volunteer committee which handled the benefit flying meet at Curtiss Field, Garden City, L. I., for the family of the late Belvin W. Maynard, has made his final report based on the audit of all accounts. The figures follow:

| | |
|---|---|
| Total receipts | $2,148.00 |
| Expenditures | 640.76 |
| | $1,507.24 |

Turned over to Mrs. Maynard.

## Winter Flying at Peoria

In spite of the cold winter weather the school of flight of the Varney Aircraft Co., of Peoria, Ill. is still operating. Two of their students, Leslie Gingerich, and "Bud" Hammond, made solo flights on Christmas day.

No non-freezing solution is used in the radiator. The front of the radiator is covered with sheet aluminum, similar to the procedure used with motor cars, and the water and oil is drained every night at the cessation of flying. Before starting in the morning the radiator is filled with boiling hot water, and the oil sump is filled with warm oil. A special winter oil is used. Slightly larger jets are used in the carburetor. With these precautions excellent results are being obtained. There is no difficulty in starting the motor, and to date there has not been a forced landing due to engine trouble.

The winter air is excellent for flying instruction, being about the same throughout the day, as it is in the mornings and evenings during the summer time. The wind seems to be a little stronger than in the summer but is much steadier. With large wind-shields and heavy flying suits the students do not complain of the cold.

As yet the snow has not been deep enough to bother. After a morning spent on landings and take-offs the instructor can take the student out to the section of the field where he has been landing and show him just what kind of landings he has been making. If he bounced on a landing the tracks in the snow will show it. It will show just about the violence of the bounce by the length of the skip in the tracks. In a porpoise landing the ships will show the number of bounces together with the length of each bounce. If he lands with any drift on, the track in the snow will be a little wider than usual, and the amount of drift can be easily determined. If he curves or ground-loops on his landings the tracks will show it.

There is a decided tendency of the ship to spin around quickly on the ground if care is not taken. This makes taxiing a little more difficult than usual, especially in a wind. A special pair of skis are being designed which will be used in the place of the wheels if the snow should become too deep for the use of wheels.

## R-38 Memorial Prize

The following entries for the R.38 Memorial Prize, the closing date for which was Dec. 31, have been received by the Council of the Royal Aeronautical Society.

Comr. F. L. M. Boothby.
Capt. Elbridge Colby.
A. P. Cole.
Wing Comdr. J. N. Fletcher.
Comdr. J. C. Hunsaker, C. P. Burgess, S. Truscott (joint authors).
Robert Jones.
Maj. G. H. Scott, Lt. Col. V. C. Richmond (joint authors).
Norman Meadowcroft.
R. H. Upson.
Prof. Dr. T. v. Kàrmàn.
Ing. Rodolfo Verduzio.
Dr. Karl Wegener, Dr. Karl Schneider (joint authors).

Entrants are reminded that their papers, together with the signed declaration required by the regulations, must reach the Secretary not later than March 31, 1923.

The Secretary of the R.Ae.S. also announces that through further donations the society's R-38 Memorial Research Fund had increased on Dec. 31, 1922, to £1264.19.11.

## German Aircraft in Russia

An Associated Press dispatch from Moscow, dated Feb. 2, announces that the Council of Commisars of Russia has granted the Junkers Airplane Co. of Dessau, Germany, the right to build and operate aircraft in Russia, and to establish an airway service by way of Russia from Sweden to Persia.

# ARMY AND NAVY AIR NEWS

## Air Service

**Purpose of the Army "Transport" Planes**—The recent proposal to aircraft builders to submit bids for ten Army "Transport" planes, extended by the Engineering Department of the Air Service at McCook Field, is believed by some Army officials to be the forerunner of an independent Army Air Force. With the employment of these machines at five or six air centers for transport of passengers and supplies, the future dependence of the Army Air Service on land transportation is obviated. In a field expedition or maneuver, a group of such planes could readily keep the aerial lines of communication open for an advance air force by bringing up supplies, spare parts, munitions, as well as personnel.

The first use of the planes, however, will be between large air service stations and posts where immediate transportation of officers and men or supplies is necessary. Probably the planes will be distributed between six stations, not more than two going to a single post. Further plans for their use are not yet definitely decided upon.

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**A Speech of General Patrick**—Addressing the Directors of the American Defense Society and their guests recently, Maj. Gen. Mason M. Patrick, Chief of Air Service, made a forcible presentation of the need for an adequate, efficient, up-to-date Air Service as a component of the Army of the United States, and of the role this Air Service would play in National Defense.

Among other things, General Patrick said, "An Army with the antiquated weapons used in our Civil War would have a better chance for victory over one equipped with machine guns and modern cannon than an Army without aircraft over one supplied with these aerial fighting machines. Military men have agreed that in the next war, if one side can obtain and maintain supremacy in the air, it will inevitably be the victor. The only adequate defense which can be opposed to an attacking Air Force is an Air Force of our own. The people of Europe learned these facts at first hand, by bitter experience. They know the efficacy of aircraft in war and they know it is vitally necessary for them to protect themselves by maintaining Air Forces of their own. There is no need to argue with them, to demonstrate to them, they know. Here we were spared most of the horrors of war. Our people did not have these facts bombed into them as did they in England, France and Belgium. It is scarcely too much to say that a few bombs dropped by hostile aircraft in the United States might have done more good than harm, as they would certainly have aroused our people and convinced them of the necessity for the development of aviation.

"The mission of the Air Service may be divided into two parts. On the one hand, acting as an auxiliary arm, it will assist the ground troops by gathering information, by observing and directing our own artillery fire, acting thus as the eyes of the Army. On the other hand, the Air Force will itself attack the enemy's ground troops, his concentration points, his railroad centers, his lines of communication. It is conceivable that an Air Force of proper strength, properly equipped, well trained, at the very outbreak of hostilities can carry the war into the enemy's country and may be so effective that the ground armies will never come in contact. In any event, the issue will be decided in the air and the victor in the air will dictate peace on the ground.

"The bombing experiments carried on something over a year ago proved conclusively that aircraft bombs could put out of commission or sink any Naval vessel which, up to that time, had been built or designed. Since then we have done much to develop planes which will carry even larger bombs and sights which will increase the accuracy with which these bombs can be dropped. It is not even necessary to make a direct hit upon the vessels, as bombs exploded close alongside under water will either sink them or damage them so materially that they will be put out of action. The Air Service does not fear the effect of anti-aircraft fire from the vessel decks. If this should prove unduly severe in the day time, the aircraft would then attack at night, carrying parachute flares, which when dropped would light up the sea for miles, while the aircraft above these lights would be absolutely invisible from the fleet below. A hostile fleet must depend for its defense against aerial attack upon aircraft carried with it. Our own Air Force must be large enough to cope with any which can accompany such a hostile fleet, sweep it from the sky and clear the way for our bombing aircraft to do their work."

* * *

**Scott Field Activities**—Although yet in the stage of development as a lighter-than-air post, Scott Field is beginning to assume the aspects of a great Air Service station. A new airship hangar costing more than a million and a quarter dollars has just been completed. Two new airships, a Mullion and the D4 are being erected there, and will be in the air in a short time, bringing the number of airships in commission up to four. A new gas manufacturing plant with a capacity of six thousand cubic feet per hour will soon be finished. The Scott Field Air Intermediate Depot has been established, and has taken over the material formerly stored at Richmond, Va., and Fort Omaha, Neb. Other activities centered here and there over the post indicate the importance which Scott Field will attain in the very near future.

The Air Service Balloon and Airship School has, in addition, been in full swing for the past six months. One class of airship pilots has already been graduated, these students having taken previous work at Langley Field, and another class will finish in June. In the latter group are some thirty student officers and seventeen flying cadets, all of whom will qualify as airship pilots upon successful completion of the course.

* * *

**West Point Candidates from the Air Service**—Among the candidates selected to take the Military Academy examinations, there were six from the Air Service of the Army:

3rd Corps Area: Cyril E. Williams, Pvt., 49th Bomb Sqd.
4th Corps Area: Henry C. Fisher, Corp., 22d Obs Sqd.
4th Corps Area: John L. McDonald, Pvt. 22d Obs. Sqd.
6th Corps Area: Harold A. Kurstedt, Pvt., 1st. A.S. Group.
D. C.—Edwin R. Dixon, Pvt., A.S., Bolling Fld., D. C.
Philippines—F. T. Minor, Pvt., 3d Sqd. Pursuit.

* * *

**Air Service School at Fairfield, Ohio**—The Air Service School for all Air Service Officers on duty at the Fairfield Air Intermediate Depot, Fairfield, Ohio, commenced on Jan. 4, 1923. The course covers a period of three months and will be devoted to instruction on all types of motors and airplanes. Officers will completely dismantle, rebuild, test and fly a motor, align and rig an airplane.

* * *

**Army Orders**—Order relating to Sec. Lieut. Walter A. Bowers, A.S.O.R.C. are revoked.

Capt. Levy S. Johnson, Med. Corps, from Hawaiian Dept. to 12th Sqd., Ft. Bliss, Tex.

**Death Notices**—The Adjutant General's Offices has issued the following death notices:

RUSSELL R. FOX

Born in N. Y., Dec. 24, 1894. Appointed from New York. 2nd Lt. A. S., July 1, 1920, 1st Lt., July 1, 1920, Accepted, Sept. 17, 1920.

In Federal service other than the permanent establishment. Pvt. Co. A, 22nd Engrs. N.Y.N.G., and 102nd Engrs., June 25, 1917, to Sept. 12, 1917, Pvt. and Pvt. 1 cl. Sig. E.R.C., Sept. 13, 1917, to Apr. 22, 1918, 2nd Lt. Av. Sec. Sig. O.R.C., Apr. 23, 1918, Vacated Sept. 17, 1920.

*Service*—He was on duty at Park Field, Millington, Tenn., April 23 to May 2, 1918; at Camp Dick, Tex., and Post Field, Ft. Sill, Okla., to June 1918; at Taliferro Field, Tex., to August, 1918; enroute to and on duty in France from Aug. 17, 1918, to June 26, 1919; sick in Evacuation Hospital No. 4, New York City to July 1, 1919; at General Hospital No. 2, Fort McHenry, Maryland, to Oct. 13, 1919; on duty at Air Service Depot, Garden City, New York, to January, 1920; at Kelly Field, Tex., to Jan. 27, 1921; at Chanute Field, Ill., to date of death.

He was killed in airplane accident at Fort Sheridan, Ill., on Jan. 17, 1923.

EDGAR A. LIEBHAUSER

Born in Cal., Oct. 28, 1889. Appointed from Texas. 2nd Lt., A.S., July 1, 1920, 1st Lt., July 1, 1920, Accepted, Sept. 10, 1920.

In Federal service other than the permanent establishment. Pvt. 1 cl. Av. Sec. Sig. E.R.C., Oct. 6, 1917, to Feb. 28, 1918, 2nd Lt. Av. Sec., Sig. O.R.C., Mar. 1, 1918, Accepted, Mar. 1, 1918. Vacated, Sept. 10, 1920.

*Service*—He was under instruction at Ellington Field, Tex., March 1 to May 20, 1918; on duty as Instructor Aerial Gunnery School for Bombers, San Leon, Tex., to Dec. 16, 1918; Instructor at Ellington Field, Tex., to June 20, 1919; on duty at Airdrome, El Paso, Tex., to Nov. 17, 1919; at Kelly Field, Tex., to February, 1920; at El Paso, Tex., to May 16, 1921; enroute to and at Langley Field, Va. to June, 1921; at Fort Bliss, Tex. to date of death.

He was killed in airplane accident near Del Rio, Tex., Jan. 13, 1923.

STEWART W. TORNEY

Born in Illinois Apr. 14. 1898. Appointed from Washington. 2nd Lt. A.S., July 1, 1920. 1st Lt., July 1, 1920. Accepted, Sept. 7, 1920.

In federal service other than permanent establishment—Pvt. Av. Sec. Sig. C. & Co. E., Sig. C., March 23, 1917. to May 1, 1918. 2nd Lt. Av. Sec. Sig O.R.C., May 2, 1918. Accepted, May 2, 1918. Vacated, Sept. 7, 1920. Graduate Air Serv. Photography Sch., 1921.

*Service*—He was on duty at Gerstner Field, La., from May 2 to June 7, 1918; at Taliaferro Field, Tex., to July 10, 1918; at Garden City, L. I., and Mitchel Field, N. Y., to Dec., 1918; at Hazelhurst Field, N. Y., to Oct., 1919; at Carlstrom Field, Fla., to Nov., 1920; at Langley Field, Va., Nov. 18, 1920, to June 30, 1922; enroute to and on duty at Chanute Field, Ill., to date of death. He died Jan. 26, 1923.

* * *

**The Securing of Flying Pay**—Flying officers of both the Army and Navy, through the Comptroller general's interpretation of the Joint Service Pay Bill, in the Act of June 10, 1922, find it necessary to submit to endless "red tape" in order to secure their flying pay.

It is no longer sufficient for an officer attached and assigned to flying duty to certify to the fact that he made a certain number of flights of certain duration during the month for which he seeks his additional pay. He cannot receive credit for flying for practice, "to keep his hand in," as it were, when he is assigned to office or bureau duty, and he cannot fly for pleasure. It is necessary that he be ordered to a flight "in the line of duty," that his statement that he flew under such conditions be certified to by the field officer at the station where he made the flight, and his own superior officer. This necessitates the filling out of long and detailed forms bearing several signatures, materially increasing the duties of the flier and his superiors. Apparently the new flight-certificates or affidavits are of no greater legal value than the old flying-pay vouchers formerly honored.

In the Bureau of Naval Aeronautics and the Army Air Service, it is now necessary for an aviator to make at least ten flights, totaling four hours, during a month in order to collect this flying pay. These flights must be officially ordered for a military or naval purpose, signed and countersigned before the certificates will be honored by the Comptroller General.

The Paymaster of the Navy found it necessary to issue a fifteen-page circular to explain the regulations and requirements to the officers of the Naval flying service, so that they would not go wrong.

* * *

**Airships from Scott Field Make Non-Stop Flights**—Two airships, the A4 and the Mullion, stationed at Scott Field, Belleville, Ill., made a non-stop flight recently from that station over Springfield, Ill., and return. The ships took off at 11.00 a. m. and headed due north, with a slight head wind on their noses. Keeping close together and flying low, they passed over Hamel and Worden. From Worden the Lichfield and Madison Railroad was followed to Staunton, where they turned north again along the Chicago and Northwestern to Girard, and thence to Auburn, at which place the Chicago & Alton Railroad was followed into Springfield, arriving there at 1.00 p. m.

After circling the Capitol, the ships flew back and forth across the city for half an hour, and then turned south for the return trip. The Illinois Central was followed as far as Litchfield, where they swung west over Hornsby, and then south again crossing over Livingston and Lebanon, and landing at Scott Field at 3.30 p. m. The ships were in the air 4 hr. 35 min., and covered a distance of 225 miles.

The flight was for the purpose of training airship pilots and to stimulate interest of the people in connection with the recruiting campaign for the Air Service.

Lieut. O. A. Anderson, Air Service, piloted the A4, with Sgt. R. McIntyre as rigger, Sgt. P. Neff as engineer, and Capt. R. K. Simpson and Lieut. A. C. McKinley as passengers. Lieut. Anderson was the assistant pilot on the C2 on its transcontinental flight, and was pilot of the Pony Blimp on its record-breaking flight to Alabama recently.

Lieut. Frank M. McKee, Air Service, piloted the Mullion, with Private O. Machiowicz as engineer and Lieuts. R. S. Heald, J. P. Temple and W. C. Farnum as passengers.

## Coming Aeronautical Events

### AMERICAN

*May* — *National Balloon Race.*

### FOREIGN

**1923**

*March* 1 — *Entries close for Schneider Cup Race.*
*March* 15 — *Entries close for Dutch Height Indicator Competition.*
*March* 23 — *Entries close for Gordon Bennett Balloon Race.*
*June* 25-30 — *International Aero Congress, London.*
*July* 20- — *International Aero Exhibition, Gothenburg,*
*Aug.* 12 *Sweden.*
*Aug.* 6-27 — *Sailplane Meet, Vauville, near Cherbourg, France.*
*Sept.* 23 — *Gordon Bennett Balloon Race, Brussels, Belgium.*
*Dec.* 1 — *Entries close for French Engine competition.*

**Change in Designation**—The Adjutant General's Office advises that the following redesignations have been effected in Air Service Units:

| | | | | | | |
|---|---|---|---|---|---|---|
| Air Park | No. | 1 | becomes | 56th | Service | Squadron |
| " " | No. | 2 | " | 57th | " | " |
| " " | No. | 3 | " | 58th | " | " |
| " " | No. | 4 | " | 59th | " | " |
| " " | No. | 5 | " | 60th | " | " |
| " " | No. | 6 | " | 61st | " | " |
| " " | No. | 7 | " | 62nd | " | " |
| " " | No. | 8 | " | 63rd | " | " |
| " " | No. | 10 | " | 65th | " | " |
| " " | No. | 11 | " | 66th | " | " |
| " " | No. | 13 | " | 68th | " | " |

Air Intelligence Office No. 1 becomes 31st Air Intelligence Sec.

Air Intelligence Office No. 2 becomes 32nd Air Intelligence Sec.

Air Intelligence Office No. 3 becomes 33rd Air Intelligence Sec.

Air Intelligence Office No. 10 becomes 40th Air Intelligence Sec.

Air Intelligence Office No. 11 becomes 41st Air Intelligence Sec.

Air Intelligence Office No. 12 becomes 42nd Air Intelligence Sec.

Hq. 1st Airship Group became 21st Airship Group Hq.

* * *

**Nominations**—The President on Jan. 25 nominated 12 Second Lieutenants in the Regular Army Air Service, as follows: Leo Henry Lawson, Michael Vincent Healey, Hilton Welborn Long, Hilton John Smith, Gerald Crofoot Williams, Robert Boyd Williams, Walter Howard DeLange, Walter Sidney Smith, Ralph Adel Shaveley, John Francis McCowan and Glen Trice Lampton.

## Naval Aviation

**Naval Orders**—Lieut. Joseph B. Anderson, det. Nav. Air Sta. Pensacola, Fla.; to Nav. Air Sta. Lakehurst, N. J.

Lt. Comdr. Joseph M. Deem, det. Rec. Ship, New York; to Nav. Air Sta. Lakehurst, N. J.

Ens. Alva Henderson, det. U.S.S. Cyro; to Nav. Air Sta. San Diego, Calif.

Comdr. Joseph A. Murphy (Med. C.), det. Nav. Hosp. San Diego, Calif.; to Nav. Air Sta. San Diego, Calif.

Comdr. Royall R. Richardson, det. Nav. Air Sta. San Diego, Calif.; to U.S.S. Oklahoma.

Comdr. Vaughn K. Conan, det. Bu. Aer.; to U.S.S. Delaware as exec. officer. (Succeeded by Capt. A. W. Johnson as aide to Rear Admiral Moffett.)

Ch. Mach. Emmett C. Thurman, det. Nav. Air Sta. Hampton Roads, Va.; to Nav. Air Sta. Lakehurst, N. J.

Lieut. Hugh C. Frazer, det. Aircraft Sqds., Scouting Fleet; to Aircraft Sqds., Battle Fleet.

Lieut. Cornelius V. S. Knox (C.C.), det. Nav. Inspector of Aircraft, Stout Eng'g Laboratories, Inc., Detroit, Mich.; to Nav. Aircraft Factory, Philadelphia.

* * *

**Aircraft Squadrons, Scouting Fleet**—On Jan. 29, Scouting Plane Squadron of 18 planes left Key West for Mariel, Cuba, where it arrived at 1.30 p. m. Jan. 29. The U.S.S. Shawmut, tender for Scouting Squadrons, proceeded to a position between Mariel, Cuba, and Mugeres Island to stand by for the trip of the planes Jan. 30. At 9.00 a. m. the Scouting Squadron left Mariel for Mugeres Island, a distance of 255 miles over the open sea. Fifteen of the eighteen planes arrived at Mugeres Island in the afternoon, and there joined the tenders Sandpiper, Teal and Mallard. The remaining three landed and anchored off Cape San Antonio, the western most point of Cuba. These planes remained there over night and left to join the main body of the Squadrons at Mugeres Island the next morning. The landing of the seaplanes off Cape San Antonio was necessitated by slight motor trouble.


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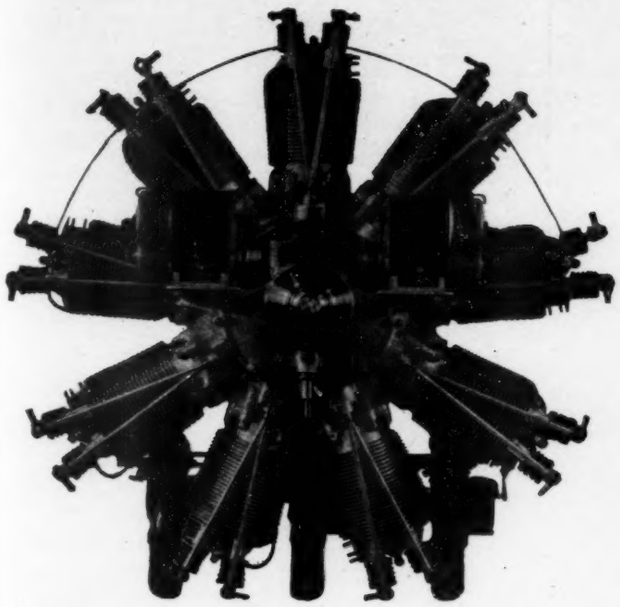

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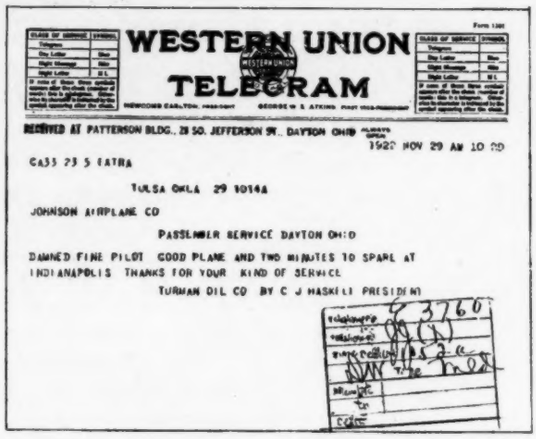

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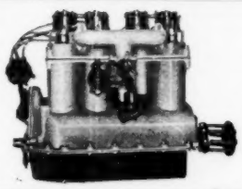

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